RW AF 2655

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

First Named Inventor : David N. Weise	Appeal No.
Appln. No. : 09/903,055	
Filed : July 11, 2001	Group Art Unit: 2655
For : METHOD AND APPARATUS FOR PARSING TEXT USING MUTUAL INFORMATION	Examiner: Rivero, M.
Docket No.: M61.12-0349	

REPLY BRIEF

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PATENT ATTORNEY

Sir:

This is in reply to the Examiner's Answer of February 9, 2006. This Reply Brief addresses statements made in section (10) Response to Argument, of the Examiner's Answer.

Claims 1-3, 6 and 8

On page 10 of the Examiner's Answer, the Examiner admits that Su does not "denominate" its syntactic score as mutual information. The Examiner goes on to say however that the syntactic score disclosed by Su is able to "suggest" a mutual information metric.

Appellant first notes that claims 1-3, 6 and 8 were rejected under 35 U.S.C. §102(b). As such, Su must do more than simply "suggest" a mutual information metric, it must in fact show a mutual information metric. *Getcher v. Davidson*, 116 F.3d 1454, 43 USPQ2d 1030, 1035 (Fed. Cir. 1997)("to hold that a prior art reference anticipates a claim, the Board must expressly find that every limitation in the claim was identically shown in the single

reference"). The fact that the Examiner admits that Su does not show a mutual information metric means that the rejection under 35 U.S.C. §102(b) should be reversed.

In addition, Appellant disagrees with the assertion that Su's syntactic score suggests a mutual information metric. On page 11 of the Examiner's Arguments, the Examiner asserted that "Su's syntactic score, like Applicant's mutual information score, is not a mere conditional probability measure but a metric partly composed of conditional probabilities, refer to column 13, lines 34-40, wherein Su discloses the syntactic score may be calculated as the product of probabilities and that these probabilities may be simplified into conditional probabilities." The statement that Su's syntactic score is not a mere conditional probability measure is incorrect. In fact, the syntactic score shown by Su is nothing more than a conditional probability.

In particular, viewing Equation 6 on col. 13, line 50 of Su, the syntactic score is first defined as the probability of a set of phrase levels L_8 through L_2 given a phrase level L_1. ($SCORE_{syn}(Syn_A) = P(L_8, L_7 \ldots L_2 | L_1)$). This is a conditional probability: the probability of a group of phrase levels given on phrase level. In the second and third lines of Equation 6, Su shows that this conditional probability can be calculated by taking the product of the conditional probability of a phrase level being reduced given the previous sequence of phrase levels. ($P(L_8|L_7 \ldots L_2, L_1) * P(L_7|L_6 \ldots L_1) * \ldots P(L_2|L_1)$).

Thus, the product of the probabilities represents a conditional probability and each term in the product of probabilities is itself a conditional probability. These individual conditional probabilities are further simplified to reduce the number of phrase levels that they are dependent upon in the next line of equation 6. This produces an approximation to the conditional probability using a product of conditional probabilities. The last lines of Su show the actual values that

make up the phrase levels, again showing a product of conditional probabilities that approximates the conditional probability $P(L_8, L_7 \ldots L_2 | L_1)$.

Thus, Su's syntactic score is in fact a conditional probability that is approximated by a product of conditional probabilities. The only reason it is an approximation is that the conditional probabilities used in the product are conditioned on fewer phrase levels than would be required to accurately compute the conditional probability. This approximation does not change the fact that Su's syntactic score is a mere conditional probability.

As indicated in Appellant's Brief, a conditional probability is very dissimilar from a mutual information metric. While one of the mutual information metrics used in the present invention utilizes mutual information in combination with a conditional probability, this does not mean that a conditional probability suggests mutual information. As noted in Appellant's Brief, conditional probabilities provide very different information from mutual information metrics. As such, a conditional probability by itself does not suggest the use of a mutual information metric. For example, it is not clear how or if mutual information could be used in place of the conditional probability shown in Su to generate Su's syntactic score.

On page 12 of the Examiner's Answer, the Examiner asserts that because Su's syntactic score and Appellant's mutual information metric are both statistical measures, Su's conditional probability suggests a mutual information metric.

This is simply not true. One statistical measure does not suggest another statistical measure and statistical measures cannot be interchanged freely. As such, Su's syntactic score does not show or suggest a mutual information metric as found in the present application since a mutual information metric provides substantially different information from a conditional

probability.

Lastly, on page 13, the Examiner asserts that mutual information is per se a well-known statistical tool, which is commonly used in corpus linguistics. While mutual information is a known statistical measure, it is not applicable in all situations. For example, in Su, it is not clear that mutual information could be used in place of the conditional probability used to form the syntactic score since mutual information would provide a different type of information from the conditional probability. Thus, even though mutual information is known, it is not obvious that mutual information based on a phrase level of a node should be used to score a node as found in the present claims.

Claims 5, 10, 12 and 14-19

On page 13 of the Examiner's Answer, the Examiner indicates that "Collocation information and mutual information are well-known in the art as statistical alternatives that fulfill a part-of-speech disambiguation purpose, therefore the use of a collocation probability can suggest the use of a mutual information metric in the corresponding art." However, as noted in Appellant's Brief, the collocation information shown in Kucera is not an alternative to mutual information because it does not provide the correlation between two events. Further, Kucera does not show or suggest mutual information involving a phrase level, since Kucera makes no mention of a phrase level. Since the collocation information of Kucera is not the same as mutual information and does not involve the use of a phrase level, Kucera's collocation probability does not suggest the use of a mutual information metric that is based on a phrase level.

Claim 7

On pages 13 and 14 of the Examiner's Answer, the

Examiner states that Su generates a score that is based on all the identified word classes because all possible lexical categories for a word are accounted for and when obtaining a final score for a word sequence, the lexical categories for each word in a sequence is weighted so that the final score reflects a level of certainty for the selected tagging/parsing.

To support this statement, the Examiner cites Col. 18, Lines 1049 of Su. The reference to a weighted lexical category and context probabilities found in column 18, lines 17-19 of Su is not a weighting of categories relative to each other. Instead, it is the weighting described by Equation 4 of Su where the context probability is weighted relative to the lexical category probability. Thus, one lexical category for a word is not weighted relative to another lexical category for the word.

In addition, as indicated in Appellant's Brief, Su's lexical score for a sequence of parts of speech is based on a single part of speech for each word. As such, the individual scores are not based on all possible parts of speech for a word, but instead each score is based on a single part of speech for a word. This can be seen from the fact that a score for a particular sequence of parts of speech will not change regardless of the other parts of speech a particular word in the sequence could be placed in. For example, in the example given by the Examiner on page 14, if the word rose could only be in two classes, noun and verb, with the probability of being a noun remaining at .6 and the probability of being a verb changing to .4, a score for a sequence of parts of speech that included the noun would remain unchanged. Thus, the score does not take into consideration all of the parts of speech that a word could posses, but only takes into consideration a single part of speech and the probability associated with that single part of speech.

Claims 13, 21 and 22

On page 14 of the Examiner's Answer, the Examiner stated that both Su and Kucera disclose determining a mutual information metric based on all possible word classes for a word in a text segment. As noted above, neither Su nor Kucera show or suggest mutual information. In addition, neither shows or suggests using all possible word classes for a word to determine a single score. As such, the combination of these references does not show or suggest determining a mutual information metric based on all possible word classes for a word in the text segment.

Conclusion

For the reasons discussed above and for the reasons provided in Appellant's initial Brief, Appellant requests that the Board reverse the Examiner's rejection of claims 1-3, 5-8, 10, 12-19, 21 and 22.

The Director is authorized to charge any fee deficiency required by this paper or credit any overpayment to Deposit Account No. 23-1123.

Respectfully submitted,

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